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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,234	08/31/2005	Charles M Ward-Close	4827-5	2518
23117 7590 06/12/2008 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
KESSLER, CHRISTOPHER S				
ART UNIT		PAPER NUMBER		
1793				
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06/12/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/529,234

Applicant(s)

WARD-CLOSE ET AL.

Examiner

CHRISTOPHER KESSLER

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 31-50 is/are pending in the application.
- 4a) Of the above claim(s) 32,34,35,44 and 46-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 31,33,36-43 and 45 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7 March 2008.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. Certain documents cited in the IDS have not been made available to the Examiner. These documents have been crossed off the IDS. Documents only available in languages other than English have not been considered and have been crossed off the IDS.

Election/Restrictions

2. Applicant's election of Group I in the reply filed on 7 March 2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 32, 34, 35, 44, and 46-50 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Drawings

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "4" has been used to designate both titanium dioxide powder and a crucible. The Examiner notes also that several other reference numbers are improperly used to refer to different parts. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of

the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. Figures 1, 2 and 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 31, 33, 36-43 and 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "substantially equal to or higher than the melting point" in claim 1 is a relative term which renders the claim indefinite. The term "substantially equal to or higher than the melting point" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. There is no indication in the instant specification as to what temperature range comprises substantially equal to the melting temperature.

Each of claims 33, 36-43 and 45 is dependent on claim 31 and carries all limitations of that claim.

The Examiner notes that the similar phrase "substantially all of the contaminating impurities" is defined by the specification at page 4.

7. Claims 31 37 and 40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 31 recites the limitation "the contaminating impurities." There is insufficient antecedent basis for this limitation in the claim.

Claim 37 recites the limitation "the impurities." There is insufficient antecedent basis for this limitation in the claim.

Claim 40 recites the limitation "the impurities." There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 31, 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over European Patent Application 0 047 665 invented by Evans, et al. (hereinafter "Evans").

Regarding claim 31, Evans teaches the invention substantially as claimed. Evans teaches a method of metal distillation (see abstract). Evans teaches that it is known to refine volatile metals by heating to their boiling points (see p. 1). Evans

further teaches that other metals such as titanium, may be refined (purified) by heating such that the volatile impurities are vaporized (see pp. 1-2). Evans does not teach wherein the metal is produced by an electrochemical reduction. However, the limitation "manufactured by an electrochemical reduction process" is a product by process limitation. The titanium described by Evans is equivalent to titanium made by the electrochemical reduction process.

Evans teaches that a sponge is suspended in a heating source and heated to vaporize impurities (see pp. 3-5, claim 7, Fig 1). Evans teaches that the metal is heated to temperatures as high as 1100 C (see p. 4), meeting the limitation of "substantially equal to the melting point." Evans teaches that the impurities are removed from the vicinity of the metal (see p. 5). Evans does not teach wherein the metal is cooled and collected, however, these steps would have been obvious to one of ordinary skill in the art. It would have been obvious to one of ordinary skill in the art to have practiced the method of Evans, and to have cooled and collected the metal sponge afterward, in order to recover the metal refined by the process, as would be reasoned through common sense by one of ordinary skill in the art.

Regarding claim 43, Evans teaches wherein the metal may be titanium (see p. 2).

Regarding claim 45, Evans teaches that magnesium is removed from the metal (see pp. 3-5).

10. Claims 31, 33, 37-39, 42, 43 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4,602,947 issued to McClincy et al. (hereinafter "McClincy").

Regarding claim 31, McClincy teaches a method of purifying titanium particles (see Abstract). McClincy teaches that titanium is heated to evaporate impurities and particles are recovered (see cols. 4-5). McClincy teaches to heat titanium metal particles to temperatures of 800-1000 C to evaporate zinc impurities (see cols. 4-5), meeting the limitation of "a temperature substantially equal to or higher than the melting point." McClincy teaches that the process takes place in a vessel (see cols. 4-5), meeting the limitation of suspending the particles. McClincy does not teach cooling the particles and collecting the particles. It would have been obvious to one of ordinary skill in the art to have practiced the method of McClincy, and to have cooled and collected the metal particles afterward, in order to recover the metal purified by the process, as would be reasoned through common sense by one of ordinary skill in the art. McClincy does not teach wherein the particles are manufactured by an electrochemical process. However, the limitation "manufactured by an electrochemical reduction process" is a product by process limitation. The titanium described by McClincy is equivalent to titanium made by the electrochemical reduction process. Applicant is further directed to MPEP 2113.

Regarding claim 33, McClincy teaches wherein the particles are finely divided (see cols. 4-5), meeting the limitation of a powder.

Regarding claim 37, McClincy teaches that the particles are heated (see cols. 4-5), meeting the limitation of a heat source. McClincy teaches that the titanium and the impurities are collected separately (see cols.4-5, Fig. 3).

Regarding claim 38, McClincy teaches that the particles may be recovered through gravimetric separation (see cols. 4-5), thus meeting the limitation of allowing the particles to freefall past a heat source.

Regarding claim 39, McClincy teaches that the fall is sufficient to allow solidification (see cols. 4-5).

Regarding claim 42, McClincy is applied to the claim as stated above.

Regarding claim 43, McClincy teaches that the particles are titanium (see cols. 4-5).

Regarding claim 45, McClincy teaches that the impurities comprise magnesium (see cols. 4-5).

11. Claims 36, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over McClincy as applied to the claims above, and further in view of Mac Rae, "Plasma ARC Process System, Reactors, and Applications", Plasma Chemistry and Plasma Processing, Plenum Press, New York, 9(1) SUPPL:85S-118 (1989) (hereinafter "Rae").

Regarding claim 36, McClincy is applied to the claim as stated above. McClincy does not teach wherein the heat source is a plasma torch, a laser, electric arc or induction coil.

Rae teaches apparatus and methods used in the art of metal production (see p. 85S). Rae teaches that plasma heating is used to refine waste powders into usable metals (see pp. 113S-114S, fig. 25). Rae teaches that this method uses a plasma torch, (see Figs. 22 and 25). Rae teaches that the use of plasma arc can reduce dependence on fossil fuels (see pp. 85S-87S).

It would have been obvious to one of ordinary skill in the art at time of invention to have used the apparatus of Rae to practice the method of McClincy in order to reduce dependence on fossil fuels, as taught by Rae (see pp. 87S).

Regarding claim 40, Rae teaches to use a plasma torch.

Regarding claim 41, Rae teaches wherein the volatilized material is collected on a cold collector plate adjacent the heat source and then recovered (disposed) (see fig. 25, pp. 113S-114S).

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER KESSLER whose telephone number is (571)272-6510. The examiner can normally be reached on Mon-Fri, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

csk